



Sonication Standard Laboratory Module (SLM™)

General Overview of the Sonication SLM

Sonication is a sample preparation process used to extract analytes from soils. It uses focused, high-intensity sound waves to agitate solid samples in a pure solvent to promote contaminant extraction.

Environmental Protection Agency (EPA) Method

Sonication is based on the method described in EPA Method 3550.

Standard Analysis Method (SAM)

This SLM supports any organic SAM system requiring the extraction of organic contaminants from solid samples.

Advantages

The increase in precision and accuracy provided by the Sonication SLM improves the quality and repeatability of sample processing. Safety enhancements for the worker are also significant.

General Description of the Sonication SLM

In the manual sonication method a worker places a soil sample into a beaker, adds sodium sulfate until the mixture is free-flowing, then adds surrogate spikes and extraction solvent. The laboratory technician then positions the beaker beneath the sonication probe where the contents of the beaker are thoroughly mixed using ultrasonic energy. The worker must rotate the beaker occasionally to ensure that the contents are thoroughly mixed. After several minutes, the worker removes and stores the liquid portion of the mixture and adds new extraction solvent and repeats the process as required. Following sonication all the liquefied mixture is drawn through a filter to remove any remaining solids.



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Figure 1. The Sonication SLM.

This process has been automated in the Sonication SLM. In the automated version, the sample/sodium sulfate mixture is introduced into the SLM in a 500-mL beaker. The Sonication SLM measures and adds precise volumes of the surrogate and spike compounds and dispenses precise volumes of extraction solvents into the sample mixture.

Operation of the SLM is through a keyboard and display interfaced to an onboard controller. External control is established via RS-232 serial communications. The Sonication SLM is designed to process a sample every 15 minutes including rinsing glassware and advancing the filtering media.

In addition to using this SLM to support the overall Contaminant Analysis Automation (CAA) Program, the CAA team is applying this technology to industry partners, other government agencies, and the CAA Remote Analytical Laboratory. The overall objective is to transfer this technology to industry, where it can be developed and marketed.

Status

The Sonication SLM is currently available for licensing. Other arrangements such as Cooperative Research and Development Agreements are negotiable.

Industrial Partner

SciBus Analytical, Inc.

Developers

Los Alamos National Laboratory and Idaho National Engineering Laboratory.



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